



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/573,671

03/24/2006

David John Hill

124-1154

5058

23117 7590 05/15/2009
NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER

KIM, ELLEN E

ART UNIT

PAPER NUMBER

2874

MAIL DATE

DELIVERY MODE

05/15/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/573,671	Applicant(s) HILL ET AL.	
	Examiner Ellen Kim	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

NON-FINAL OFFICE ACTION

In view of the Appeal Brief filed on 1/12/2009, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Uyen-Chau N. Le/

Supervisory Patent Examiner, Art Unit 2874

Response to Arguments

Applicant's arguments with respect to all the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

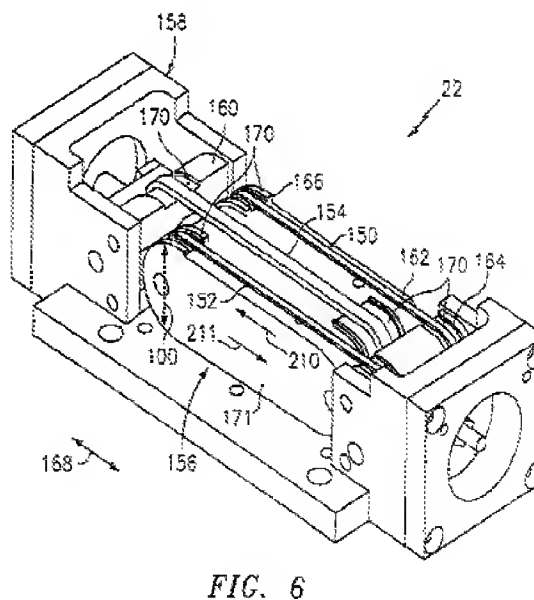
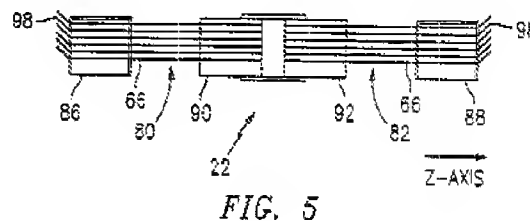
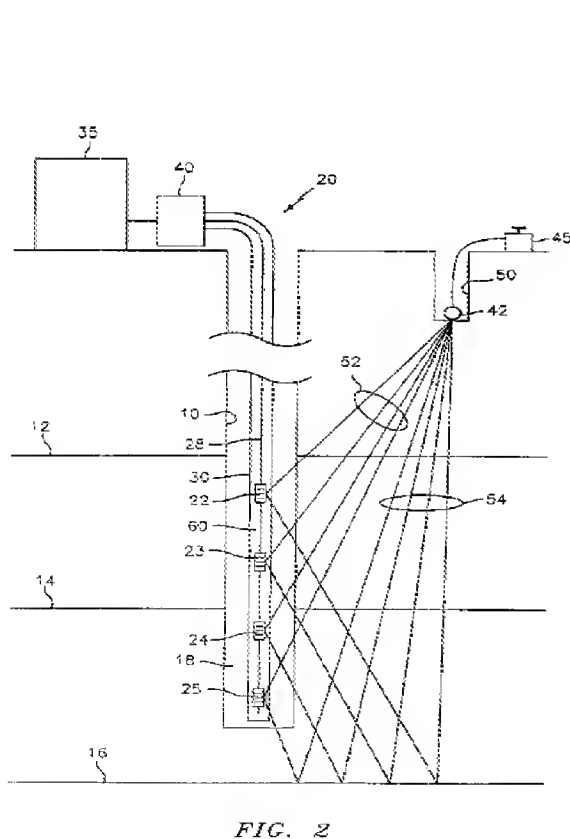
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10, 15, and 16 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Knudsen et al (USPAT 6,575,033).

Knudsen et al disclose an optical device comprising:



Accelerometer **22** may be fabricated with scale factors of between 500 and 5000 krad/G that covers the range of scale factors, as detailed herein below, necessary to use this accelerometer in seismic applications. As previously noted, interferometer measurement systems exhibit scale factors that increase with increased fiber length. As best shown in FIG. 5, the fixed mandrels **86, 88** and floating mandrels **90, 92** are used to create multiple coil turns of fiber **66** in each elastic support member **80** and **82**, thereby enabling a small package for an accelerometer with high scale factor.

at least two fiber-optic point sensors **22, 24** in fig. 2; and

Distributed fiber-optic sensor (see the optical fiber package including fiber **66** of sensor **23** which is , the detail is shown in fig. 5 and 6) linking said at least two fiber-optic point sensors **22, 24**, wherein said sensor array provides an array output of sensed data from said at least two fiber-optic point sensors and said distributed fiber-optic sensor (see that the existence of the signal converter **40** and signal processing equipment **55** reflects that the sensor array provides array output of sensed data).

In re claim 2-4, Knudsen et al teach at column 5, lines 10-15 that the structure **10** may be subjected to be interrogated, in fig. 2 the fiber-optic cable **28**, and at column 2, line 51, a transducer (abstract) and a wire cable (electrical strain gauge can be utilized, see column 16, line 51).

In re claim 5, fig. 5 and 6 shows that the optical fiber wound into a flexural disc.

In re claims 6 and 7, Knudsen et al show at column 3, line 52-55 that the fiber optic point sensors are for measuring seismic data (geophone), and accelerometer.

In re claim 8, Knudsen et al show at column 7, lines 39-54 that in the accelerometer 22 the effective scale factor can be described in terms of the strain (pressure) applied to the fibers.

In re claim 9, Knudsen et al show in abstract that interferometric system is utilized.

In re claim 10, Knudsen et al show at column 15, lines 52-65 that Michaelson Interferometer (reflectometric interferometer) can be utilized.

In re claims 15 and 16, Knudsen et al show all the claimed structural limitations, and the claimed method steps are inherently done by Knudsen et al device for the purpose of measuring and analyzing the optical signal.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

Art Unit: 2874

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knudsen et al in view of Cranch et al (“Large-Scale Multiplexing of Interferometric Fiber-Optic Sensors Using TDM and DWDM”, Journal of Lightwave Technology, Vol. 19, No. 5, May 2001, Cranch et al, pp 687-699).

Knudsen et al disclose every aspect of claimed invention except for the pulsed reflectometric interferometric system (claim 11) employing time-division multiplexing (claim 12). Note that Knudsen et al teach at column 16, lines 60-end that any strain sensors, optical fibers may be attached to the elastic support members.

Cranch et al show the general teaching of utilizing the pulsed reflectometric interferometric system employing time-division multiplexing for the purpose of individual sensor signals to be distinguished in the multiplexed array (see page 687, right column, line 1-2).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify Knudsen et al device to include the pulsed reflectometric interferometer as shown in Cranch et al for the purpose of individual sensor signals to be distinguished in the multiplexed array. It is clear that this would improve the device.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knudsen et al in view of Kleinerman (USPAT 5,991,479).

Knudsen et al disclose every aspect of claimed invention except for the pulsed Rayleigh-backscatter interrogation system. Note that Knudsen et al teach at column 16, lines 60-end that any strain sensors, optical fibers may be attached to the elastic support members.

Kleinerman shows the general teaching of utilizing the pulsed Rayleigh-backscatter interrogation system.

It would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify Knudsen et al device to include the pulsed Rayleigh-backscatter interrogation system as shown in Kleinerman for the purpose of measurement of temperature and/or forces distributed over many locations, simultaneously and with a single fiber probe (see column 5, lines 1-9). It is clear that this would improve the device.

Conclusion

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

For all official patent application related correspondence for organizations reporting to the Commissioner of Patents:

Art Unit: 2874

- Correspondence that is transmitted by facsimile must be directed to the central facsimile number, (703) 872-9306.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ellen Kim whose telephone number is (571) 272-2349.

The examiner can normally be reached on Monday through Thursday.

/Ellen Kim/
Primary Examiner,
Art Unit 2874
May 14, 2009/EK